THE ROLE OF THE OCCUPATIONAL HEALTH NURSE IN DEVELOPING AND IMPLEMENTING A WORKPLACE INFLUENZA IMMUNIZATION PROGRAM

by

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ABSTRACT

The influenza virus infects millions of individuals each year. "Between one percent and twenty-six percent of persons aged 18 to 64 years may be infected with influenza annually and the associated work absenteeism can result in substantial societal costs" (Bridges, et. al., 2000, page 1655). No one is immune from the virus and variations in the strains from year to year result in annual outbreaks or epidemics.

For the working population, the risk of complications from the flu is much lower than in the high-risk groups. However, lost workdays, decreased productivity, and the spread of the infection to co-workers, cost businesses millions of dollars each year. The focus of this paper is to look at the role of the Occupational Health Nurse (OHN) in developing and implementing an influenza immunization program at the work site.

Controversy exists regarding the cost benefit of such a program and confounding factors, such as a shortage of the vaccine and a dramatic increase in price have occurred since the most recent cost benefit studies have been published. However, the efficacy of the influenza vaccine and the lack of significant adverse reactions have been well documented.

A well planned, efficiently implemented, and extensively evaluated onsite influenza immunization program will be efficacious in reducing absenteeism and lost productivity.

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CHAPTER 1

Introduction

The influenza virus infects millions of individuals each year. "Between one percent and twenty-six percent of persons aged 18 to 64 years may be infected with influenza annually and the associated work absenteeism can result in substantial societal costs" (Bridges, et. al., 2000, page 1655). Influenza can be a serious medical problem for which only limited treatment is available. There are a vast number of over-the-counter medications for treatment of the symptoms, but very few antiviral drugs are available. The antiviral medications include Amantadine, Rimantadine, Zanamivir, and Oseltamivir, with specific mechanisms for treating influenza A but have no effect on influenza B (GlaxoSmithKline, 2002; Burton, 2000). These antiviral medications only shorten the course of illness by one to two days, but are much more effective in decreasing the number and severity of complications (Burton, 2000). Although young healthy adults do not suffer the higher rates of mortality associated with influenza that are seen among individuals over 65 or those who have chronic diseases, they do experience increased morbidity, lost workdays, and lost productivity due to influenza infection.

Several agencies including the Centers for Disease Control and Prevention (CDC) recommend the influenza vaccine be given annually to certain individuals in what are considered high-risk groups. Although adults younger than the age of 50 years are not considered to be at high risk for serious complications from the flu, they still suffer from the consequences of lost work time. It has been

documented that worksite influenza immunization programs produce significant health and economic benefits for both the employee and their employers (Dille, 1999). Nichol documented that the cost from absenteeism was significantly reduced for workers in all age groups who received the influenza vaccine (Nichol, et. al., 1996). One study has shown the cost benefit of providing workplace vaccination programs to healthy working adults had a mean savings of $13.66 per person (Nichol, 2001).

Over the years the recommendations regarding who should be vaccinated have greatly expanded. The most recent information from the U.S. Public Health Service's Advisory Committee on Immunization Practices (ACIP) recommends that physicians administer the influenza vaccine to any person who wishes to reduce the likelihood of becoming infected with the flu (MMWR, April 2002).

The Occupational Health Nurse (OHN) must consider several factors when making the decision to offer a workplace immunization program. What are the benefits to the company, the employee, the employee's family and the community as a whole? Is the program going to be cost-effective? Are there liabilities that the company may incur? Are there other less costly strategies for preventing the spread of influenza among healthy adult workers? Will the employees be receptive of the program?

In 1996, the National Institute for Occupational Safety and Health (NIOSH) published the National Occupational Research Agenda (NORA). "This agenda which identified 21 research priorities, was designed to and continues to provide a framework to guide occupational safety and health research in the next decade for

the entire occupational safety and health community" (Rogers, 2002, page 301). The purpose of NORA is to focus research in the areas with the highest likelihood of reducing workplace injury and illness. It is important to note that infectious diseases are an integral part of the NORA research priorities (Rogers, 2002). As stated by Dr. Bonnie Rogers in her book, Occupational Health Nursing Concepts and Practice (page 36), "...prevention marks the cornerstone for occupational health nursing practice." The occupational health nurse's role is to improve, protect, maintain, and restore the health of the worker (Rogers, 1994). This paper will describe the strategies the OHN must use in developing and implementing an influenza immunization program to prevent the spread of the highly contagious influenza viruses that occur annually throughout the world.

CHAPTER 2

Literature Review

Why would an organization want to develop and implement an influenza immunization program within the workplace rather than in the community since the "flu" is not considered a work-related illness? While it is true that the actual disease process is not an outcome associated with or arising out of the performance of one's job duties, the illness does impact lost work days and productivity. Although the elderly and those individuals with chronic diseases are more vulnerable to the complications of the flu, **anyone** can get the flu. According to the CDC, "most people who get the flu will recover in one to two weeks, but some will go on to develop life-threatening complications" (CDC, 2002). In addition, the CDC states that about 10% to 20% of the U.S. population (millions of people) will get the flu each year.

Influenza Virus

Definition

Influenza, commonly called the "flu", is a highly contagious viral infection of the nose, throat and lungs that is one of the most severe illnesses of the winter season. Symptoms of the disease include sudden onset of fever, myalgia, sore throat, nonproductive cough, headache, muscle aches, weakness, and extreme fatigue. Influenza is easily transmitted from person to person by inhaling droplets containing viral particles that are suspended in the air from the cough or sneeze of an infected individual, or from direct contact (CDC, 2002). Influenza virus may survive for up to 48 hours on nonporous surfaces such as doorknobs, telephone receivers, computer keyboards, etc. (Homeland Health Specialists, 2002). The

virus enters the body through the mucous membranes of the eyes, nose, or mouth and then reproduces rapidly in the host.

The very young, the elderly, and those with chronic diseases are at greater risk for increased morbidity and mortality due to complications from influenza infections. Complications may include sinusitis, bronchitis, otitis media, pneumonia, and death (World Health Organization, 1999). Influenza is a seasonal disease that can undergo minor genetic changes or mutations from season to season, leading to the development of new strains (Aventis Pastuer, 1998).

Although millions of individuals are infected with influenza each year, some flu seasons are classified as epidemics or pandemics. An epidemic occurs when an infectious disease is present in several geographic regions, among many people at the same time. A pandemic occurs when the epidemic reaches worldwide proportions (American Museum of National History, 1999). The influenza virus has caused many epidemics throughout history and has also been responsible for three pandemics in the last century (CDC, 2002).

Types

There are three types of influenza viruses: influenza A, B, and C. Influenza A can infect both humans and animals and causes pandemics, epidemics, and seasonal outbreaks. Influenza B and C only infect humans. Outbreaks of Influenza B have led to epidemics (National Foundation of Infectious Diseases, October 2000). Influenza C produces only mild illness, similar to the common cold, and has not been responsible for epidemics or pandemics (NFID, 2000) (see Table 2.1).

Table 2.1

CHARACTERISTICS OF THE DIFFERENT TYPES OF INFLUENZA

CHARACTERISTICS	INFLUENZA A	INFLUENZA B	INFLUENZA C
Produces infection in humans	YES	YES	YES
Produces infection in animals/birds	YES	NO	NO
Causes epidemics	YES	YES	NO
Causes pandemics	YES	NO	NO
Mild illness only	NO	NO	YES

The disease is characterized as an acute respiratory illness that is not clinically differentiated from other acute respiratory illnesses but must be confirmed by laboratory tests such as serum antibody tests, virus cultures, or rapid diagnostic tests such as Directigen Flu A, Flu OIA, QuickVue or ZstatFlu (GlaxoSmithKline, 2002).

Influenza A viruses are divided into subtypes based upon proteins on the surface of the virus. These proteins are called hemagglutinin (H) and neuraminidase (N). Each strain of influenza virus is labeled according to the type of protein. For example, the strains of influenza A present at this time in the Northern Hemisphere, are A(H1N1) and A(H3N2) (CDC, 2002). Variations in membrane proteins hemagglutinin and neuraminidase allow the viruses to escape immunity to previous strains (Earn, et. al., 2002). Influenza B is not divided by subtypes and is identified only as influenza B.

Changes in Influenza A are brought about by antigenic "shifts or drifts." A shift in the virus means that the strain has an abrupt major change that results in a new hemagglutinin or neuramindase (CDC, 2002). Shifts only occur occasionally and most people have little or no immunity to the new strains. Such a shift can lead to a pandemic. Drifts, however, are the gradual accumulation of mutations in the hemagglutinin or neuramindase. This occurs annually and is the trigger for epidemics (Schneider, 2000).

Both subtypes of influenza A and the strain of influenza B are included in the production of the annual influenza vaccine. Because the development of the vaccine takes months to complete, the actual composition of the vaccine is based

upon predictions of which strains will be circulating for a given year. The efficacy of the influenza vaccine is dependent upon how well the strains used to manufacture the vaccine "match" the strains causing the illness (NFID, 2000). Obviously, when the vaccine closely matches the circulating strains of the virus which are present in the community the efficacy of the vaccine increases.

Historical Perspective

The flu is one of the oldest and most common diseases known to man. Influenza was first described by Hippocrates in 412 BC and the first well-described pandemic of an influenza-like disease occurred in 1580 (World Health Organization, February 1999). Three pandemics due to influenza A have occurred in the past century (Earn, et. al., 2002).

The largest number of deaths due to influenza occurred between 1918 and 1919 during what has been named the Spanish flu pandemic. After World War I, this virulent strain of influenza reached every part of the world within one year (Zackowitz, 2002). In the United States during the Spanish flu pandemic, 50,000 people died and as many as 20 to 50 million people may have died worldwide. The Spanish flu was unique because almost half of the deaths were among young, healthy adults (CDC, 2002).

Two other pandemics, one in 1957, "Asian flu," and one in 1968, "Hong Kong flu," caused wide spread morbidity but had much lower mortality rates (Subbarao, 2001, p. 9). The Asian flu contributed to about 70,000 deaths in the U.S. It was first identified in China in February 1957 and spread to the U.S. by June 1957. The Hong Kong flu was first identified in Hong Kong in early 1968 and spread to

the U.S. later that year. The Hong Kong flu caused an estimated 34,000 deaths in the United States (CDC, 2002). However, the cumulative mortality and morbidity rates for influenza are largely due to seasonal epidemics (Earn, et. al., 2002).

Epidemics, or outbreaks, are confined to a limited region and occur virtually every year, but vary in intensity. An outbreak commonly lasts about five to six weeks with no more cases reported for another year. A typical epidemic follows a characteristic pattern (see Figure 2.1).

In closed communities such as nursing homes, an influenza epidemic may infect up to 60% of the residents. Epidemics of the flu generally occur in the Northern Hemisphere between December and April and between May and September in the Southern Hemisphere. In the tropical regions, outbreaks most often develop during the rainy season (GlaxoSmithKline, 2002).

Morbidity/Mortality

In an average year, more than 20,000 deaths and 200,000 hospitalizations occur in the U.S. due to influenza (NFID, 2000). Influenza is not a recordable disease; however, it is estimated that 10% to 20% of the population is infected with influenza each season (CDC, 2002). Of those who are infected, one percent will require hospitalization and among that group as much as eight percent will die. These figures are for the general population and include all age ranges, high and low risk individuals, and healthy adult workers (CDC, 2002). Influenza and influenza-related complications rank as the sixth leading cause of death in the United States (Immunization Practices Advisory Committee, 1992).

Figure 2.1

CHARACTERISTICS OF A TYPICAL EPIDEMIC

- In the beginning there is an increase in the number of children developing fever.
- Cases reach a peak in 2 – 3 weeks.
- An increasing number of adults report influenza-like symptoms.
- Absenteeism from work and school peaks.
- Increased hospital admissions for patients with pneumonia, heart problems, and exacerbations of chronic respiratory diseases.
- There is a subsequent corresponding rise in deaths from these conditions.

Source: Worldwide Vaccines – GlaxoSmithKline (2002)

The attack rate for healthy adults ranges from 5% to 15%, with about 45% of these cases requiring medical attention (Nichol, 2001). Although there are associated lost workdays with the illness, working adults tend to continue to work while ill, or return to work before they are fully recovered, thus exposing their coworkers to the disease. Because of these differences, when the OHN is developing the recommendations for a worksite immunization program, information regarding the impact of influenza upon healthy working adults must be separated from the health effects upon the general population.

Recommendations

Centers for Disease Control and Prevention (CDC)

The Advisory Committee on Immunization Practices (ACIP) is an arm of the CDC, which publishes annually the current recommendations for the distribution and administration of the influenza vaccine (see Figure 2.2).

While the CDC is considered to be the world authority on infectious diseases and its recommendations are the basis for standards of practice, it does not have regulatory authority. This is important to remember in light of the past two years' shortage of vaccine. Although the CDC clearly outlined who should receive the vaccine, because of the shortage and the purchasing powers of large corporations, many of the individuals defined as high risk were not necessarily the first ones to be vaccinated when the vaccine became available. The 2002 CDC/ACIP recommendations addressed this problem.

Figure 2.2

RECOMMENDATIONS FOR ANNUAL INFLUENZA IMMUNIZATIONS

- persons aged ≥ 50 years;*
- residents of nursing homes and other long-term care facilities that house persons of any age who have long-term illnesses;
- adults and children ≥ 6 months of age who have chronic heart or lung conditions, including asthma;
- adults and children ≥ 6 months of age who need regular medical care or had to be in a hospital because of metabolic diseases (like diabetes), chronic kidney disease, or weakened immune system (including immune system problems caused by medicine or by infection with human immunodeficiency virus [HIV/AIDS]);
- children and teenagers (aged 6 months to 18 years) who are on long-term aspirin therapy and therefore could develop Reyes Syndrome after the flu; and
- women who will be more than 3 months pregnant during the flu season.

*People 50-64 years of age who do not have chronic (long-term) medical conditions might not be at high risk for serious complications from the flu. However, about 26% of people aged 50-64 years have high-risk conditions and are at increased risk for flu-related complications. Beginning in 2000, flu immunization was recommended annually for all people 50-64 years of age to increase the number of high-risk 50-64 year olds who received a flu shot.

Source: Centers for Disease Control and Prevention (July 9, 2002)

In addition to the recommendations in Figure 2.2, ACIP added five principal changes or updates as follows:

1. The optimal time to receive influenza vaccine is during the months of October and November. However, because of vaccine distribution delays during the past two years, ACIP recommends that vaccination efforts in October focus on persons at greatest risk for influenza-related complications and health-care workers and that vaccination of other groups begin in November.
2. Vaccination efforts for all groups should continue into December and later, for as long as vaccine is available.
3. Because young, otherwise healthy children are at increased risk for influenza-related hospitalization, influenza vaccination of healthy children aged 6 – 23 months is encouraged when feasible. Vaccination of children aged $\geq$ 6 months who have certain medical conditions continues to be strongly recommended.
4. The 2002-2003 trivalent vaccine virus strains are A/Moscow/10/99 (H3N2)-like, A/New Caledonia/20/99 (H1N1)-like, and B/Hong Kong/330/2001-like strains.
5. A limited amount of influenza vaccine with reduced thimerosal content will be available for the 2002-2003 influenza season (MMWR, 2002).

Recommendations by Other Health Care Entities

Aventis Pastuer, a prominent vaccine producer, clearly defined high-risk groups as individuals over the age of 65 years. However, the company did not address the new recommendations concerning people older than 50 years,

children ages ≥ 6 months to 23 months, nor did they delineate the immunization schedule (Aventis Pasteur, 1998). Aventis Pasteur's recommendations were published on their website in 1998 and had not been updated in the past four years.

Homeland Health Specialists, Inc., promoted influenza vaccinations on their website. The first two pages are devoted to documenting the seriousness of the illness and the fact that anyone over nine years of age may receive the vaccine from them. Corporations are encouraged to schedule a flu shot clinic and to "hurry" because Homeland Health Specialists' calendar was filling fast for the 2002 flu season. It wasn't until the fifth page that recommendations were given for older adults and high-risk individuals. As with Aventis Pasteur, the newest CDC/ACIP recommendations were not incorporated into the information. However, Homeland Health Specialists, Inc., updated their website in 2002 (Homeland Health Specialists, Inc., 2002).

While multiple sources may provide valuable information, the most recent and accurate recommendations for annual influenza immunizations are still provided by the Centers for Disease Control and Prevention. Of the other sources of recommendations reviewed, including Aventis Pastuer, Homeland Health Specialists, Inc, and GlaxoSmithKline, almost every one cited the CDC/ACIP recommendations but they were not necessarily the most recent recommendations.

Cost to Society

Each year over 110 million workdays are lost because of infection with influenza with associated costs to U.S. businesses of more than $7 billion in sick pay and lost productivity (Noonan, 2000). According to Wayne N. Burton, MD,

Senior Vice-President and Corporate Medical Director for Bank One, the costs are somewhat less with 15 to 80 billion work days lost in the U.S. annually and a cost of $3 billion to U.S. businesses (Burton, 2000). In data compiled by Kristin Nichol, M.D., in 1995, annual cases of influenza resulted in 200 million days of restricted activity, 100 million days of bed disability, 75 million days of absenteeism from work, and 22 million visits to a health care provider.

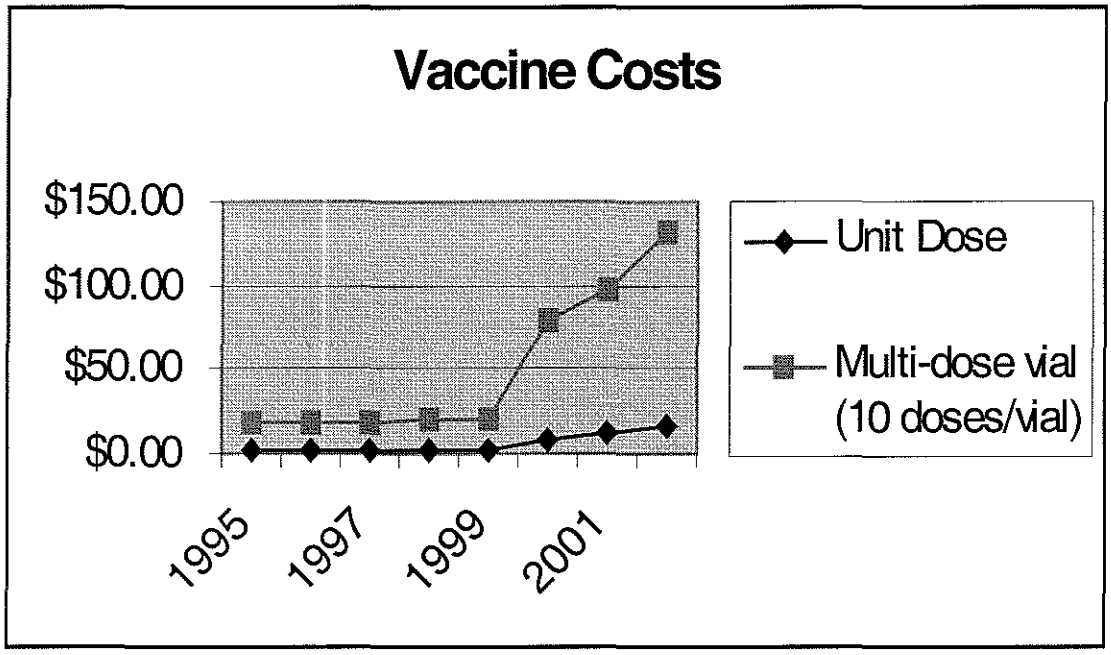
Influenza affects up to 25% of the population each year. Less than 25% of the population aged 18 to 64 received the flu immunization in 1997, yet the effect upon this age group is substantial. The average case of influenza usually lasts five to six days, with a large number of episodes resulting in three to four days of bedrest and an additional three days of work absenteeism (Nichol, 2001).

Current Gaps in the Literature

The findings concerning the efficacy of the influenza vaccine for young, healthy, adults have been inconsistent (Grotto, et. al., 1998). Cost benefit analysis studies were completed prior to the shortage of the vaccine and the associated increase in costs for the vaccine (Nichol, 2001; Dille, 1999; Fitzner, et al, 2000). Data showing positive cost benefits for immunizing individuals who do not fall into a high-risk category are no longer valid because the cost of the vaccine is based upon the pre-shortage price. In 1998 the cost of the influenza vaccine for a multi-dose vial of ten doses from the medical supply company *QuickAid,* was $21.50. Today, that same vial even at a discount rate is $132.00 (see Table 2.2).

Table 2.2

COST OF INFLUENZA VACCINE PER YEAR



Source: QuickAid Medical and Edwards Medical Supply

Live, attenuated intranasal influenza virus vaccines, are being introduced and may have a higher protection rate, but also have higher costs per person. One study conducted by Nichol, et.al., (1999) concluded that the intra-nasal vaccine was effective in healthy working adults. However, the study focused on reduction in lost workdays, but did not include a cost benefit analysis.

Studies to assess the effects of vaccine supply delays upon those in the high risk groups as well as healthy adults between the ages of 18 years and 64 years are important, particularly if the delay in inoculating healthy adults will lead to increased cases of influenza among this population. This is critical in light of the new recommendation that individuals in the high risk groups be inoculated in October and healthy adults in November (MMWR, 2002).

While reduction in the number of cases of influenza has remained unchanged, the cost of the vaccine has soared. In 2000, one of the largest manufacturer's of the influenza vaccine was forced to stop the production of the vaccine due to non-compliance with FDA regulations for the manufacture of vaccines (Edwards, 2000). Other companies were not prepared to fill the orders that had been submitted to this company, resulting in a significant delay in the manufacture and delivery of the vaccine to clinics. Businesses that had ordered the vaccine in March were the first to receive the vaccine, rather than health care clinics. This meant that many individuals with chronic illnesses, those over the age of 64, and/or those who were immunocompromised did not receive the vaccine before healthy adult workers. Again in 2001 there was a shortage and a slight delay in the delivery of the vaccine.

The events of 2000 and 2001 led to a dramatic increase in the cost of the vaccine. The OHN must make the necessary cost adjustments when utilizing previous studies for documenting the cost benefits of the proposed influenza vaccine campaign. Studies conducted prior to 2001 were conducted when the cost of the vaccine was as low as $2.00 per injection. In 2002 the cost of a single injection ranged from $6.00 to $10.00 per injection, thus cost benefits may not be as substantial as reported in the earlier studies.

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CHAPTER 3

INFLUENZA IMMUNIZATION IN THE WORKPLACE

Business Concerns

Absenteeism, Replacement and Overtime Costs

The majority of workers in America are 18 to 64 years of age. The influenza vaccine is only recommended for a small portion of these employees, yet each year millions of Americans "come down with the flu." Traditionally, healthy working adults have not been included in campaigns targeting individuals who should receive the influenza vaccine. Each year between 5% and 15% of these individuals lose work time due to acute infection, yet many 18 – 64 year olds also come to work ill (Nichol, 2001).

When employees are out of work for three or four days, it is usually not feasible to bring in temporary help, yet the work must be completed. To fill in the gap, co-workers often have to work overtime to meet production quotas and deadlines. A 2000 Canadian study examined the costs of employee absenteeism and found that direct and indirect costs combined in lost production accounted for 17% of payroll in 1997 (Watson Wyatt Worldwide, 2000).

Absenteeism in administrative and executive personnel results in additional costs as work may be postponed. Meetings may be cancelled or rescheduled, travel plans rearranged, etc., all of which result in indirect costs associated with the absenteeism.

Interruption of Service and/or Product Delivery

One facet of customer service that has been widely promoted in the past ten years is the production concept of "Just in Time" Inventory Systems. The "Just in Time" concept schedules materials to arrive exactly when they are needed in the production process (MarketVolume, 2002). The system has allowed American companies to cut down the amount of inventory kept in their warehouses. This manufacturing technique works well when there is a stable source of supply. However, when supply is disrupted due to a shortage in manpower, the lack of inventory often results in plant shutdowns (Schuster, 2001).

If a company repeatedly fails to meet the customer's deadlines for delivery of raw or intermediate materials, that customer will ultimately take his business elsewhere. Even though the severity of the illness among healthy adults may only result in three to five days away from work, during an epidemic as much as 50% of a department may be out at one time (Nichol, 2001). Using an average income of $15.00 per hour, direct costs associated with absenteeism ranged from $360.00 to $600.00 per employee. If ten employees were out of work for three days due to influenza, the direct cost of the absenteeism would be $3,600.00. This does not include indirect costs such as overtime, temporary staffing, or lost production. As the epidemic spreads throughout a company, more interruptions in production and delivery will occur.

Lost or Reduced Sales and Productivity

Healthy adults infected with influenza not only lose time from work, but when acutely ill, they lose some ability to perform reaction time tasks similar to that seen with alcohol consumption (Nichol, 2001). Working while acutely ill results

in significant reduction in productivity. This increases the chance of spreading or extending the epidemic because individuals are typically infectious from the day before symptoms begin until approximately five days after the onset of illness (MMWR, 2002).

Health Benefit Cost

The cost benefits of the inactivated influenza vaccine in reducing influenza illness and its complications for persons aged 65 and older are well-documented (Aventis Pastuer, 1998; MMWR, 2002; WHO, 1999). However, the benefits of an annual influenza vaccination campaign for healthy adults younger than 65 years of age are less clear (Bridges, et. al., 2000). When documenting the health benefit costs for a specific illness or prevention of that illness, it is necessary to examine the real-time costs that are charged back to the business as well as the indirect costs associated with lost work days (Nichol, et. al.,1995).

In developing the cost-effectiveness report for a specific company, the OHN must determine what benefits are already provided by the company's health insurance plans, associated costs for both the employee and the company, and to what extent the benefits are utilized. However, the majority of companies rarely do this. While larger companies may have this capability, small companies seldom do it unless they have support from their third party administrators in providing disease/illness specific costs per illness/employee. Visits to the physician's office or admission to the hospital are coded according to the complications that brought the individual to seek medical care, such as pneumonia or sinusitis. Influenza may be a secondary diagnosis but is not always listed because laboratory confirmation is not routinely done.

As documented by Sessa, et. al, (2001), yearly influenza epidemics are not only associated with substantial loss of productivity, but there is also an increased pharmaceutical expenditure related to the excess prescription of antibiotics to treat the related bacterial complications.

Therefore, when completing the cost benefit analysis, estimates may need to be made based upon the data available for the region. For instance, Nichol, (2001), utilized the American Medial Association's Socioeconomic Monitoring System Core Survey for physician's fees, lists of diagnostic tests, and medications associated with visits to the physician for evaluation and treatment of upper respiratory tract infections.

Implied Employee Benefits

No one is immune from the influenza virus. Therefore, it is suggested that any measures used to reduce the risk of infection are beneficial to the general population as well as those individuals in the high-risk groups. In theory, if healthy adults are given the influenza vaccine, they will either be prevented from developing the illness or face only very mild symptoms due to the illness. Vaccination will also reduce transmission from person to person because healthy adults, as well as individuals with chronic diseases, will have developed antibodies to the current strain of influenza (CDC, 2002).

In addition to the reduction in lost workdays, the vaccinated worker will not need to seek medical care for treatment of the illness or its complications.

Prevention of Illness

The influenza vaccine efficacy rate, as documented by a randomized trial among health care professionals at John Hopkins University Hospital and School of Medicine, was 88% for Influenza A and 89% Influenza B. This resulted in 9.9 days of absence per 100 subjects that received the vaccine versus 21.1 days of

absence per 100 subjects for individuals that did not receive the vaccine (Nichol, et. al., 1999).

The efficacy of the vaccine in reducing laboratory-confirmed illness is in the range of 70% to 90%, when there is a good match between the circulating viruses and the corresponding vaccine strains (Nichol, 2001).

Decreased Severity of Illness

The consequences of the introduction of a new variation of influenza A into the general population can be dramatic and may lead to a pandemic (Subbarao, 2001). Two hundred World Health Organization laboratories in 79 countries maintain global surveillance of the influenza virus. Through this collaborative effort, the virus is isolated worldwide throughout the year. From this surveillance data predictions are made concerning which strains of influenza will be circulating in the coming year (NFID, 2000). As stated earlier, when the vaccine closely matches the circulating strains, the vaccine is much more effective (Nichol, et. al., 1995).

Reduction in Complications

Rapid changes in the circulating types of influenza virus make it necessary to reformulate the composition of the vaccine each year. "Prevention and control are thus the only realistic means of dealing with influenza" (WHO, 1999, page 1).

Even if the vaccine cannot protect the person from the flu, it may protect them from severe complications or even death (NFID, 2000). In addition, the CDC stated in April 2002 that although antiviral medications are now available, these medications are not a substitute for vaccination. New intranasal vaccines are still being evaluated and may provide even greater protection (Nichol, et., al., 1999).

Effects on Family

More studies need to be instituted to evaluate the effects of the adult worker influenza immunization program upon the family unit. The studies by Nichol (2001), Dille (1999), and Fizner, et. al., (2000) reviewed the indirect costs and savings to the business or the employee, but did not address the benefit or lack of benefit of the immunization program on the family. ACIP does recommend the vaccination for individuals who are a "household member" in close contact with persons at high risk (MMWR, 2002).

When workers are immunized the family benefits from the decrease in exposure to infected individuals. Influenza is more easily spread among individuals that live together. Immunization of the healthy adult workers in the family decreases the risk that these individuals will carry the virus home to other family members. This is especially critical when there are family members with chronic illnesses, that are immunocompromised, or under the age of six months (CDC, 2002).

CHAPTER 4

PROGRAM PLANNING/IMPLEMENTATION

A useful model to guide program planning and implementation is the health promotion model developed by Rogers (1994). This model incorporates the key components of program assessment, program planning, program implementation, and program evaluation, which are integral to a successful program. It is easily applied to an influenza immunization program at the workplace. Each of the steps will be discussed in detail (see Figure 4.1).

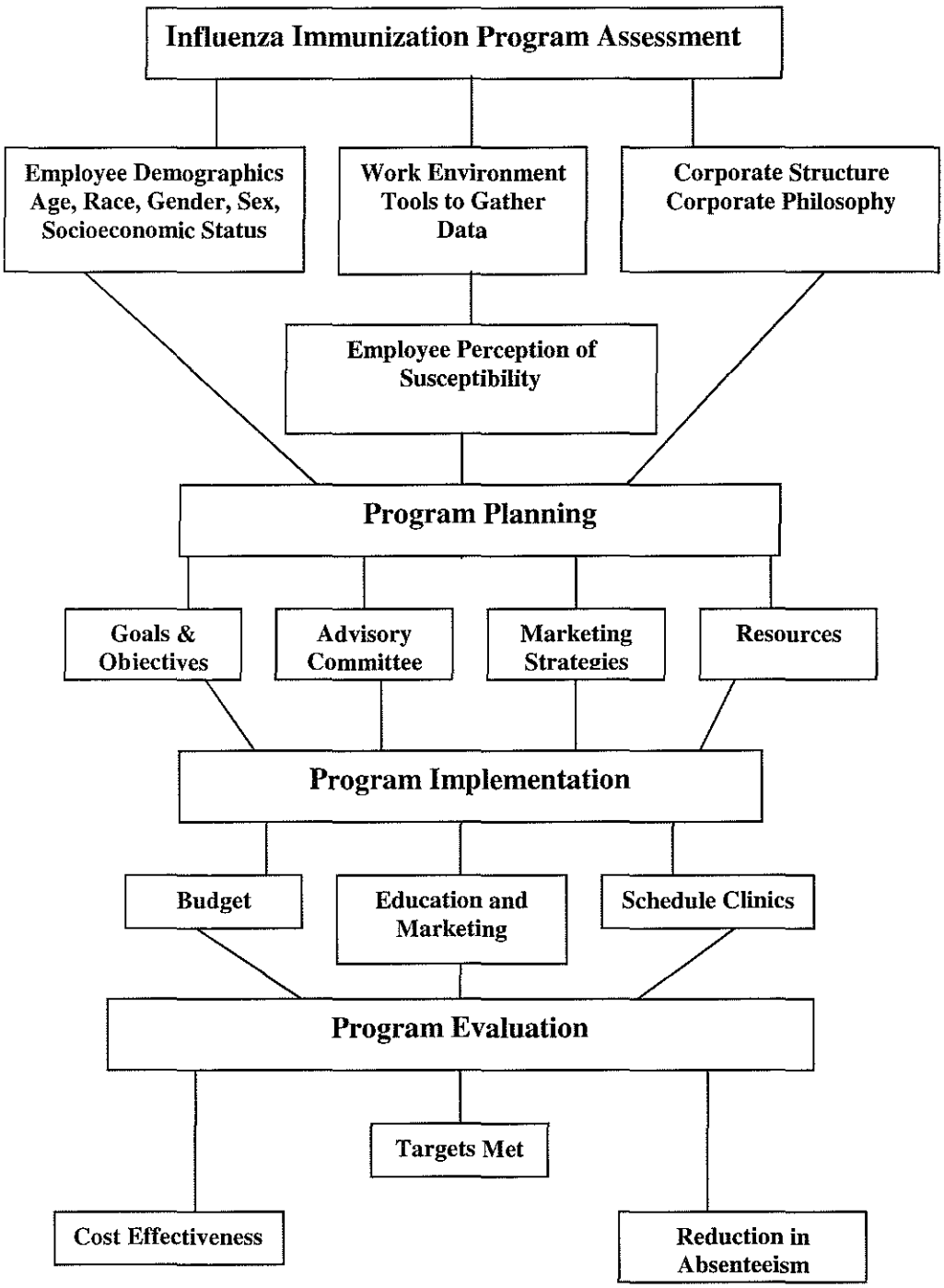
Program Assessment

The first step in planning any type of program for the work site is the assessment of the worker population. The OHN must understand the demographic characteristics of the population such as number of employees, age range, male/female ratio, level of education and language composition (Travers, 1994). The initial review of demographics should include the above characteristics and highlight those employees who fall within any of the high-risk groups targeted by the CDC and ACIP as the recommendations were recently changed to include immunizing people aged 50 years and older. The OHN should also have a firm grasp on which employees have chronic illnesses, as well as employees who live with individuals in the high-risk groups. If available, this information should be gathered during the assessment phase and would be a crucial component in promoting the immunization program.

With respiratory illnesses more prevalent during the fall and winter in the

Figure 4.1

SYSTEMATIC APPROACH TO DEVELOPING
A WORKPLACE
INFLUENZA IMMUNIZATION PROGRAM



Source: Occupational Health Nursing Concepts and Practice, **Rogers (1994)**

Northern Hemisphere, the OHN must assess the work environment during these seasons. Do workers come in closer contact during these months? Are doors kept closed, is humidity up or down, are employees encouraged to come to work even if ill, and is there sufficient housekeeping to destroy viral particles left on desks, doorknobs, and telephones?

The OHN must also understand the corporate philosophy and structure. If the philosophy of the company does not encompass employee health and wellness, the OHN may find it necessary to persuade management about the benefits of such programs. "Fostering a supportive environment or changing an environment to encourage a concept of health will go a long way in improving ultimate health behavior and outcomes" (Rogers, 1994, p. 298).

The program needs the support of both the workers and management to be successful. Buy-in from management and the employees assures a more successful campaign. The structure of the corporation must be such that the employees are encouraged and allowed to participate in the programs that are offered. If the company operates 24 hours a day, seven days a week, management must be willing to alter the work processes so that employees are allowed time to participate in the immunization program.

Utilization of the Health Belief Model, developed by Hochbaum, Kegeles, and Rosenstock will aid the OHN in identifying the workers' perceived susceptibility, perceived seriousness, and perceived threat of developing influenza (Rogers, 1994). The Health Belief Model (HBM) is based upon the premise that an individual will participate in a health behavior to prevent disease based upon four basic parameters.

When applying the HBM to an influenza immunization program, the OHN is assessing the employees':

- Perception of their susceptibility to the flu,
- The seriousness of the disease or its complications if they should contract the flu,
- The person's understanding of the potential benefit of the flu vaccine, and
- The person's perception of barriers to taking the vaccine (see Table 4.1).

It has been documented that workers who had higher scores for susceptibility, seriousness, benefits, cues to action, knowledge, and health motivation with lower scores for barriers, were more likely to accept the immunization (Blue, 2002).

One method of collecting data about the worker is an employee survey. By administering a health survey, the OHN is fostering employee ownership of the program. Analyzing absentee records, employee health encounter logs, and insurance data for the past flu season, gives the OHN a better understanding of the impact the flu season had upon the worker population.

The administration and evaluation of an employee questionnaire/survey must be completed early in the year in order for the OHN to establish the amount of vaccine to be ordered. Also, by administering the questionnaire in January or February, while respiratory illnesses are still prevalent, the employees should have better recall of past infections. Once spring and summer arrive, it is difficult to remember the severity of last winter's illness (see Figure 4.2).

Table 4.1

HEALTH BELIEF PARAMETERS APPLIED TO AN INFLUENZA IMMUNIZATION PROGRAM

Parameter	Low Understanding/Perception	High Understanding/Perception
Perception of Susceptibility	I am too young to get the flu.	Anyone may contract the flu.
Perception of Seriousness	The flu is just a bad cold.	The flu may have serious complications.
Understanding of the Illness	The flu shot will give me the flu.	The flu shot has a high likelihood of preventing the flu.
Barriers to Taking the Vaccine	My insurance doesn't cover the flu shot.	My company provides the flu vaccine free of charge at work.

Another source of information is the company health history questionnaire. If the questionnaire is administered to employees on a periodic basis, then this information may be recovered from the individual medical records. More general information may be obtained from the review of insurance claims, but in light of the newly enacted regulations of the Health Insurance Portability and Accountability Act of 1996, these records may not be as readily accessible.

Figure 4.2

INFLUENZA SURVEY

In preparation for this year's flu season, we must order our vaccine by the end of April. Please complete the following questionnaire and return to Medical Services by March 15.

Please circle yes or no

1. I am 50 years old or older. yes no
2. I have a chronic illness such as diabetes or heart disease. yes no
3. In the past I have taken the flu shot. yes no
4. I live with a family member who has a chronic illness such as diabetes or heart disease. yes no
5. I am immunocompromised. yes no
6. I live with a family member who is immunocompromised. yes no
7. I have children who will be at least 6 months of age by November of this year. yes no
8. I receive the flu shot from my physician. yes no
9. If the flu shot were offered at work, for a nominal fee I would take it. yes no
10. If the flu shot were offered free of charge at work, I would take it. yes no

Program Planning

The second step in the process for developing a successful influenza immunization program is the planning phase. This includes forming an advisory committee, setting goals and measurable objectives, determining additional program implementation resources, identifying marketing strategies and programmatic strategies/activities, and setting a timeline for completion of activities (Rogers, 1994).

The advisory committee should be composed of a representative from top management, the benefits coordinator, employee representatives, the occupational health nurse, and departmental managers (Rogers, 1994). The committee would assist by recommending dates, times, and places for the immunizations to be given as well as aid in promoting the program. The committee would also provide input on the goals and objectives to be met by the influenza immunization program. Such goals might include a target reduction of 10% in absenteeism or a goal that 70% of the employees will receive the vaccine. Although the committee may not have responsibility for the actual implementation of the program, they can be instrumental in getting other employees to participate in the program.

It is imperative that program goals and health objectives are identified to guide the program and provide a means for evaluating its success. Goals need to be measurable and provide the documentation of the success or failure of the program. For example, one goal of the immunization program might be a 65% return rate for the influenza survey by the deadline. The goal is measurable and will provide key data when documenting the rationale for the program.

When the program is to be provided directly by the OHN, an assessment of resources is needed (Dille, 1999). Critical resources that are needed include the following:

- Demographic data regarding the worksite population, production area in relation to the OH clinic, and the identification of employees in the CDC/ACIP defined high-risk groups.
- Space needs relative to the flow of the employees into and out of the immunization area, a waiting area, access to running water, and emergency supplies/equipment.
- Medical supplies readily available and such items as needle containers need to be immediately accessible in the work area.
- Vaccine information, consent forms, and administration records provided prior to the injection of the vaccine.
- Health education materials developed and posted in the weeks prior to the start of the clinics.
- OH clinic staffing adequate enough to prevent prolonged absence by the employees from their duties.
- Data management maintained in the immunization area.
- Use of computerized systems or laptops.

Strategic to the program is the OHN's ability to impart the need for and the benefits of the influenza vaccine, dispelling the myths about influenza and the vaccine, and reducing barriers for accessing the clinics (Blue & Valley, 2002) (see Table 4.2).

Table 4.2

STRATEGIES FOR A SUCCESSFUL INFLUENZA IMMUNIZATION PROGRAM

Strategies with Minimal Associated Costs

Have a theme similar to the theme for children's immunization clinics- "Be wise, immunize!"

Take program to the departments

Develop a group of recruiters

Have "Bring a friend with you" campaign

Send electronic reminders

Advertise in company newsletter

Strategies with Additional Costs

Give each recipient a button or sticker, such as "Be kind to me, I've had my flu shot today."

Offer incentives, prizes

Foster competition between departments by offering a pizza party to the department with the highest percentage of participation

Utilize colorful posters, brochures and other handouts to foster awareness of the program

During the planning phase, marketing strategies must also be identified and developed. Posters must be obtained, electronic messages written and distributed, and the survey must be developed, administered, and tabulated. Programmatic strategies/activities should be built upon the results of the data gathering from the survey, health history questionnaires, and the review of insurance claims. One example of a programmatic strategy would be to consider using a "flu-shot mobile." The OHN would take the supplies through the plant on a wheeled cart which makes giving the shots more convenient for the employees, decreases employee time away from the job posts, enhances the nurse's image, and increases employee participation (Blue & Valley, 2002).

The OHN and the advisory committee need to establish a timeline that encompasses the assessment, planning, implementation, and evaluation of the program (see Table 4.3). Due to the shortage and delayed production of the vaccine in the past two years, it is critical that planning begin no later than February for an October program start date. The committee must be cognizant of the fact that corporations are encouraged to place their orders for the vaccine as early as March and no later than May (Edwards Medical Supply, 2002a).

Table 4.3

TIMELINE FOR INFLUENZA IMMUNIZATION PROGRAM

DATE	ACTION
Mid January	Gather data on absenteeism for past year
February/March	Administer influenza survey to employees
April	Update procedures, consent form, and prescription order with Medical Director
April/May	Order vaccine
June/July	Develop and/or order educational and promotional materials
August	Contact supplier regarding the status of current year's vaccine supply
September	Monitor Centers for Disease Control and Prevention's recommendations for most efficacious date to begin vaccinations
October	Post dates, times, and places for immunization clinics
November	Initiate immunization program following CDC recommendations and Medical Director's written orders
December	Post reminders that the flu vaccine is still available
January	Evaluate success of program; begin gathering data from previous year
February/March	Solicit feedback from employees. Develop and present evaluation of program to management
April	Modify program as indicated by the evaluation
May	Order vaccine and continue the program cycle

Cost

The Nichol study (2001) concluded that flu immunizations for healthy working adults resulted in an average of a net cost of $2.18 to a net savings of $32.97 per employee 95% of the time. It did not take into account the vaccine shortage or the substantial increase in the cost of the vaccine.

However, the OHN must determine the direct and indirect costs associated with the seasonal spread of the influenza virus among the workforce before a monetary decision can be made regarding the program. Without comprehensive planning in the developmental stages, there is often little or insufficient data documenting the cost-effectiveness of the program (Dille, 1999). After an exhaustive review of the literature, it is still difficult to definitively establish the cost benefit of an influenza immunization program for healthy working adults.

Business priorities will also drive the program. If a company's productivity is critical during the fall and winter months, then an influenza program would be more cost-effective than for a company whose busiest season is during the summer months. The total impact of an onsite immunization program cannot be measured until a comparison of pre-immunization years with the post-immunization years is analyzed and considered with the efficacy of the vaccine against the circulating strains of influenza A and B. For example, it is not enough to compare the cost of administering the program versus the reduction in absenteeism from the previous year. The number of cases of influenza in the community (data that are available from the weekly MMWR) and its impact upon the workforce and their families must also be considered.

Ethical and Legal Considerations

Ethical and legal ramifications of an onsite immunization program must be taken into account. The program must be administered under the direction of a physician. Standing orders for administering the vaccine and how to respond to adverse reactions must be written and signed by the physician who is supporting the program. For larger corporations the physician may be an employee. Other companies may contract with a private occupational health physician or with an occupational health clinic. The majority of vaccine suppliers will require a prescription authorization form that includes the physician's state license number, his/her Drug Enforcement Administration number, and the authorization form signed by a physician. This form also lists the individuals that the physician is authorizing to administer the immunizations.

Consent forms must be developed and approved by legal counsel. The consent form may be incorporated with the immunization record. The Food and Drug Administration requires that the immunization record contain the name and address of the person administering the immunization, the date, dose, and route of administration of the vaccine, as well as the lot number, expiration date, and manufacturer.

In the past some companies had been reluctant to offer onsite immunization programs in fear that any adverse reactions would result in an OSHA recordable incident, or workers' compensation claim. However, OSHA has made it clear that complications from onsite influenza immunization are not recordable (OSHA, 2001). Nonetheless, the OHN must ensure that the physician's orders are

followed, good nursing practices are utilized, and that appropriate equipment and supplies are readily available. Failure to provide the appropriate standard of care could result in a malpractice suit against the nurse administering the vaccine and against the company, since workers' compensation would not be the exclusive remedy.

Program Implementation

The OHN must begin the implementation phase during the budgeting process for the year in which the program is to be administered. Money must be dedicated not only to the purchase of the vaccine but for the additional medical supplies such as needles/syringes, alcohol swabs, gloves, etc. Consideration needs to be given to the cost of educating the employees regarding influenza and the influenza vaccine, as well as the cost of communicating the dates, times, and locations of the "flu shot clinics." The nurse must also determine if money needs to be allocated for additional staffing or overtime during the immunization program.

If the OHN is not going to administer the program, but rather consult with a vender to deliver the program, then the costs for such a program must be identified and budgeted. Medical supply venders cannot guarantee the cost of the vaccine until the beginning of the year in which it will be administered. Therefore, the OHN must rely on the costs generated during the current year. This only becomes a problem when a shortage of vaccine occurs as it did in 2000. The replacement vaccine more than doubled the price of the previous year and the costs went up again in 2001 and 2002 (Edwards Medical Supply, 2002b).

Not knowing how many people will actually take the vaccine leaves the OHN estimating how much vaccine to order. The order should be based on the goals developed during the planning phase. If the target goal is to vaccinate 35% of the employees, then enough vaccine should be ordered to accommodate this goal. It is important to remember that the vaccine does not expire until June of the next year. The vaccine can be given as late as February when community epidemics have been identified.

A successful immunization program is one that is made available to all employees at a time and place that is convenient for them (Homeland Health Specialists, 2002). The information should be widely communicated and exceptions made for individuals that could not get to one of the scheduled times. Dille (1999) stated that management support in the form of providing access to the influenza vaccine during work hours and supporting staffing and clinical space greatly impacted the acceptance of the program.

With many businesses running 24 hours 7 days a week, it is vital that the OHN be familiar with the number of shifts, the days and times of shift changes, and the number of employees per shift. One company may have employees on eight, ten and twelve hour shifts, yet another may offer 36 hour shifts on the weekend with no work during the week. The immunization program must give each employee the opportunity to receive the vaccine at work. This means that the program should be offered over at least a four-week period, on varying days, and varying hours. The more accessible the program, the better the employee participation (Dille, 1999).

Once the employees are educated about the vaccine and are willing to participate in the program, it is essential that the clinic be set up and fully functional prior to the first employee coming in to the clinic. In addition to ordering supplies, procedures, standing orders, and protocols must be established. These must be developed in conjunction with the company's physician resources. The standing orders must include the vaccine, the dosage, route, and site of administration. Emergency procedures need to be clearly written and supplies readily available. The nurses and other occupational health staff must be trained in emergency response, including the administration of drugs such as epinephrine and cardiopulmonary resuscitation, in the event of an anaphylactic reaction to the vaccine.

Each employee must be given a copy of the CDC's Vaccine Information Sheet (VIS) for influenza to be read prior to receiving the vaccine (see Appendix). The CDC will provide a copy free of charge by calling the CDC in Atlanta, Georgia, or by downloading a copy from the website at www.cdc.gov. The employee must be given the opportunity to ask questions and receive answers before consenting to the immunization. Signed informed consent forms and the immunization administration record should be kept as part of the employee's non-occupational medical record.

Program Evaluation

Evaluation of the program begins during the planning phase. By stating specific measurable goals, the OHN will be able to document the effectiveness of the program. Goals should include a target number or percentage of employees

that are expected to receive the vaccine and what percentage reduction in absenteeism is expected due to the institution of the program. A critical component of the evaluation is the cost benefit analysis. As previously mentioned the formula must include the direct and indirect costs for the program. The costs expended must be deducted from the costs saved. Thus the cost of the program subtracted from the cost saved by the reduction in absenteeism will yield the cost benefit (or deficit) of the program (Dille, 1999) (see Table 4.4).

Employee feedback is essential to the evaluation of the program. If the program is cost-effective, but the employees were not satisfied, future programs may not be well attended. When employee surveys are administered in January or February to begin collection of information for the next influenza immunization program, the employees should be asked if they participated the past year and if they found the program beneficial. The information gathered from the questionnaire will assist in determining what changes, if any, need to be made to the program.

Table 4.4

COST BENEFIT ANALYSIS FORMULA

Direct costs:

Cost of vaccine
Cost of medical supplies

Indirect costs:

Cost of time away from job for employee
Cost of medical services staff time
Educational/communication costs
Cost of incentives

Direct costs + Indirect costs = Cost of Program

Direct prevented costs:

Cost of lost workdays
Estimated cost of medical visits prevented
Estimated cost of complications prevented

Indirect prevented costs:

Cost of reduced productivity
Cost of reduction in benefits usage

(Prevented direct and prevented indirect costs) - (Direct costs + indirect costs) = Cost benefit or deficit.

Chapter 5

ROLE OF THE OCCUPATIONAL HEALTH NURSE

Program Provided by OHN

The OHN in collaboration with the company physician, company management, and employee input determines if a work site influenza immunization program would be accepted and beneficial to the health and well-being of the employees. As researchers Nichol (2001), Dille (1999), and Bridges, et. al., (2000) have suggested, there are health and economic benefits resulting from healthy adult workers receiving an influenza vaccination. It is crucial that the OHN gather and analyze data from the worksite to ascertain if an influenza immunization program would be cost-effective and beneficial to the business.

As the key driver of the program, the OHN must be committed to developing, implementing, and evaluating the program. The OHN does more than just order the influenza vaccine and post a notice of dates and hours when the vaccine will be offered. From inception to completion the OHN must be cognizant of the impact of the program upon the employees, management, and production. The program must be health-enhancing, worker-driven, and cost-effective (Rogers, 1994).

Immunizations Provided by Contract Service

When it is not feasible for the OHN to directly provide the administration of an influenza immunization clinic, a contract service may be employed. However, contracting with an outside vendor does not relieve the OHN from the

responsibility for the planning, implementation, and evaluation of the program. The same steps must be followed with a few additions.

First, the OHN must research the venders available in the community. If they are willing to come on-site, will they be able to accommodate the shifts, days, and times that are most advantageous for the employees? Second, a contract must be written and reviewed by the company's legal counsel. Who is responsible for supplies, vaccine, emergency procedures, and disposal of medical wastes? Will the vender provide educational materials? Do they have protocols developed to be sure that state and federal regulations are being met concerning the administration of a prescription injectable medication? Does the vender carry adequate malpractice insurance? Third, will the program be cost-effective? Last, will the employees participate if the injections are not given directly by the OHN?

All of these issues need to be addressed before signing on the "dotted line."

No Immunizations Offered at the Worksite

If the company decides not to offer the influenza immunization to the employees at the worksite, the OHN still needs to address the prevention and control of the spread of influenza among co-workers. Educational materials should be readily available and prominently displayed. Resources can be obtained free of charge from the Centers for Disease Control and Prevention, the World Health Organization, and influenza vaccine manufacturers. The information should dispel the myths regarding influenza and the vaccine, as well as contain measures for decreasing the spread of the virus. This should include

recommendations for handwashing, staying home when ill, and taking appropriate measures if an employee becomes ill while at work.

CHAPTER 6

DISCUSSION AND RECOMMENDATIONS

Discussion

According to Watson Wyatt Worldwide (2000), employee absenteeism is having a greater impact on the bottom line than ever before. Short-term absence costs, as a percentage of total payroll costs, have more than doubled from 2.0 percent in 1997 to 4.2 percent in 1999. Each year over 100 million workdays are lost because of influenza and this costs American businesses more than $7 billion dollars a year in lost work days and lost productivity (Noonan, 2000).

Unlike many viruses such as the common cold, infection with the influenza virus is preventable in 70% to 90% of the population with the use of influenza vaccines (Aventis Pastuer, 1998). The Advisory Committee for Immunization Practices now recommends the influenza vaccine for anyone over the age of 50 (MMWR, 2002).

Multiple studies have been undertaken to evaluate the efficacy and cost benefits of administering the influenza vaccine to healthy working adults, and providing that immunization at the worksite. The actual cost savings has varied with each study based upon the direct and indirect costs that were used in the cost benefit analysis. The efficacy of the vaccine was not disputed. Nichol, et. al. (1995), Bridges, et. al (2000), Grotto, et. al. (1998), and Lee, et. al. (2002), all demonstrated that the vaccine was effective in reducing the number of lost workdays, the amount of febrile illnesses, and a reduction in lost productivity.

Recommendations

Based upon the literature review the efficacy of the influenza vaccine has been well-documented. In addition, the fact that the vaccine has few adverse effects makes it an ideal vaccine for general administration.

Each OHN should determine if an on-site influenza program is feasible and advisable for his/her specific company (see Table 6.1.). First the OHN ought to examine previous absenteeism rates. This information will provide the starting point for determining the possible benefits of an on-site influenza immunization program. The OHN must assess the worker population for the number of employees or employees with family members that are in high-risk groups as identified by the CDC. The nurse is urged to establish management commitment and employee support for the program.

The OHN will have to perform a cost benefit analysis to determine how the program will affect the bottom line. This should be done annually due to the fact that the virus may drift or shift, the changes in costs of the vaccine, and the number of employees who would be willing to participate in the program.

The OHN must be aggressive in educating the employees by dispelling the myths regarding influenza and the vaccine. The benefits of receiving the vaccine must be presented to overcome the negative aspects such as the aversion to receiving an injection. The program must be convenient and timely for the employees.

Finally, the OHN should provide a final evaluation of the program to management on an annual basis. This can be done in a report with individuals

Table 6.1

IFLUENZA IMMUNIZATION PROGRAM

On-site Versus Off-site Program

	On-site Clinic	Off-site Clinic
Pros	Readily accessible to the employees	Confidential
	Less time away from work to obtain the vaccine	Other family members may be immunized at the same time
	Minimal or no cost to employee	Minimal or no cost to employee
	Group support from co-workers	Less coercion from co-workers to participate in the program
	Management commitment	Management commitment
Cons	Employees may feel pressured to take the flu shot	Employees may not be allowed time off to go to the clinic
	Other family members not able to participate in the program	Not as readily accessible
	Direct and indirect costs may not allow the program to be cost beneficial	Lack of familiarity with clinic staff may deter some workers

or percentage of employees vaccinated and the absentee rate for October through February compared to previous years. In addition to the statistical information, the report should provide information on what strategies worked, which didn't work, recommendations for the next year, and employee suggestions or ideas to enhance the program. Just as it is important to have management and employee input into the development of the program, it is essential to involve them in the evaluation of the program.

Summary

Seasonal outbreaks, epidemics, and pandemics of influenza claim the lives of many individuals each year. The social and economic impact of influenza has been extensively documented from many countries, including the U.S., Canada, Italy, and Finland. Annual influenza outbreaks are associated with increased morbidity and mortality among those individuals over the age of 65 years and among individuals with chronic illnesses (CDC, 2002).

As documented by Bridges, et. al. (2000), Dille (1999), and Nichol (2001), influenza is a major cause of illness, a disruption to the daily lives, and a major cause of work absenteeism among healthy working adults. Healthy working adults between the ages of 18 years and 64 years have not been included among the priority groups targeted for receiving the influenza vaccine.

A well-defined, well-planned, influenza immunization program provided by the occupational health clinic at the worksite for healthy adult workers has been efficacious in reducing absenteeism and lost productivity. However, it is not clear if such a program produces a cost benefit. During the 1998 – 1999 flu season, a survey of 61 work-site clinics, community health departments, and other non-

traditional sites such as drug stores and grocery stores showed an average charge for vaccination of $10.00 with a range of $5.00 - $15.00 (Nichol, 2001)

Nichol (2001) completed a study that concluded flu immunizations for healthy working adults resulted in an average net cost of $2.18 and a net savings of $32.97 per employee 95% of the time. She concluded that influenza vaccination of healthy working adults on average is a cost savings.

However, these studies were conducted prior to the shortage of the vaccine in the year 2000. Following the shortage there was a tremendous increase in the costs of the vaccine. Additional studies will need to be completed to determine if on-site programs are truly cost-effective, but it is clear that the influenza vaccine is extremely effective in preventing illness and protecting the health of the worker. It is imperative that the OHN assess the worker population, the business conditions, and the predicted prevalence of influenza in the community when developing a campaign to provide influenza vaccination at the work site.

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APPENDIX

Influenza Vaccine What You Need to Know

Vaccine Information Statement

Source: Centers for Disease Control and Prevention (2002)

INFLUENZA VACCINE

WHAT YOU NEED TO KNOW

2002-2003

1 Why get vaccinated?

Influenza ("flu") is a serious disease.

It is caused by a virus that spreads from infected persons to the nose or throat of others.

Influenza can cause:

- fever
- cough
- sore throat
- headache
- chills
- muscle aches

Anyone can get influenza. Most people are ill with influenza for only a few days, but some get much sicker and may need to be hospitalized. Influenza causes thousands of deaths each year, mostly among the elderly.

Influenza vaccine can prevent influenza.

2 Influenza vaccine

Influenza viruses change often. Therefore, influenza vaccine is updated each year.

Protection develops about 2 weeks after getting the shot and may last up to a year.

Some people who get flu vaccine may still get flu, but they will usually get a milder case than those who did not get the shot.

Flu vaccine may be given at the same time as other vaccines, including pneumococcal vaccine.

3 Who should get influenza vaccine?

People 6 months of age and older at risk for getting a serious case of influenza or influenza complications, *and* people in close contact with them (including all household members) should get the vaccine.

An annual flu shot is *recommended* for:

- Everyone **50 years of age or older.**
- Residents of **long-term care facilities** housing persons with chronic medical conditions.
- Anyone who has a **long-term health problem** with:
  - heart disease
  - lung disease
  - asthma
  - kidney disease
  - metabolic disease, such as diabetes
  - anemia, and other blood disorders
- Anyone with a **weakened immune system** due to:
  - HIV/AIDS or another disease that affects the immune system
  - long-term treatment with drugs such as steroids
  - cancer treatment with x-rays or drugs
- Anyone 6 months to 18 years of age on **long-term aspirin treatment** (who could develop Reye Syndrome if they catch influenza).
- **Pregnant women** who will be past the 3rd month of pregnancy during the flu season (usually November - March, but past March in some years).
- Physicians, nurses, family members, or anyone else coming in **close contact with people at risk** of serious influenza

An annual flu shot is also *encouraged* for:

- **Healthy children** 6-23 months of age, and their household contacts and out-of-home caretakers
- **Household contacts and out-of-home caretakers** of infants less than 6 months of age
- People who provide **essential community services**
- People at high risk for flu complications who **travel** to the Southern hemisphere between April and September, or who travel to the tropics or in organized tourist groups at any time
- People living in **dormitories** or under other crowded conditions, to prevent outbreaks
- Anyone who wants to **reduce their chance of catching influenza**

4 When should I get influenza vaccine?

Most people need only one flu shot each year to prevent influenza. Children under 9 years old getting flu vaccine *for the first time* should get 2 shots, one month apart.

The best time to get a flu shot is in October or November. But because the flu season typically peaks between January and March, vaccination in December, or even later can be beneficial in most years.

Some people should be vaccinated beginning in September or October: people **65 years of age and older**, people at **high risk** from flu and its complications, **household contacts** of these groups, **health care workers**, and **children under 9** getting the flu shot for the first time. To make sure these people have access to available vaccine, others should wait until November.

5 Some people should talk with a doctor before getting influenza vaccine.

Talk with a doctor before getting a flu shot if you:

1) ever had a serious allergic reaction to **eggs** or to a **previous dose of influenza vaccine**
   or
2) have a history of **Guillain-Barré Syndrome** (GBS).

If you have a fever or are severely ill at the time the shot is scheduled, you should probably wait until you recover before getting influenza vaccine. Talk to your doctor or nurse about whether to reschedule the vaccination.

6 What are the risks from influenza vaccine?

A vaccine, like any medicine, is capable of causing serious problems, such as severe allergic reactions. The risk of a vaccine causing serious harm, or death, is extremely small. Serious problems from flu vaccine are very rare. ***The viruses in the vaccine have been killed, so you cannot get influenza from the vaccine.***

Mild problems:

- soreness, redness, or swelling where the shot was given
- fever
- aches

If these problems occur, they usually begin soon after the shot and last 1-2 days.

Severe problems:

- Life-threatening allergic reactions are very rare. If they do occur, it is within a few minutes to a few hours after the shot.
- In 1976, swine flu vaccine was associated with a severe paralytic illness called Guillain-Barré Syndrome (GBS). Influenza vaccines since then have not been clearly linked to GBS. However, if there *is* a risk of GBS from current influenza vaccines, it is estimated at 1 or 2 cases per million persons vaccinated . . . much less than the risk of severe influenza, which can be prevented by vaccination.

7 What if there is a moderate or severe reaction?

What should I look for?

- Any unusual condition, such as a high fever or behavior changes. Signs of a serious allergic reaction can include difficulty breathing, hoarseness or wheezing, hives, paleness, weakness, a fast heart beat or dizziness.

What should I do?

- Call a doctor, or get the person to a doctor right away.
- Tell your doctor what happened, the date and time it happened, and when the vaccination was given.
- Ask your doctor, nurse, or health department to report the reaction by filing an Vaccine Adverse Event Reporting System (VAERS) form. Or call VAERS yourself at **1-800-822-7967**, or visit their website at **http://www.vaers.org**.

8 How can I learn more?

- Ask your doctor or nurse. They can give you the vaccine package insert or suggest other sources of information.
- Call your local or state health department.
- Contact the Centers for Disease Control and Prevention (CDC):
  - Call **1-800-232-2522** (English)
  - Call **1-800-232-0233** (Español)
  - Visit the National Immunization Program's website at **http://www.cdc.gov/nip**

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Disease Control and Prevention
National Immunization Program